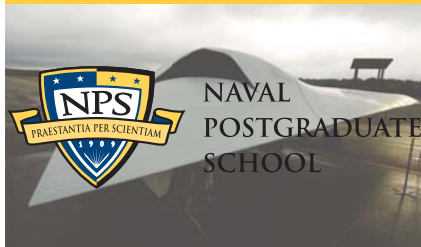




CONSORTIUM FOR ROBOTICS AND UNMANNED SYSTEMS EDUCATION AND RESEARCH

FROM TECHNICAL TO ETHICAL

FROM CONCEPT GENERATION TO EXPERIMENTATION



## CRUSER Brings Together Robotics and Unmanned Systems at NPS

by Amanda D. Stein

Chartered by Under Secretary of the Navy Robert Work, the Naval Postgraduate School has commissioned the Consortium for Robotics and Unmanned Systems Education and Research (CRUSER). CRUSER is a wide base community of interest that which offers a collaborative environment for researchers, industry, students, and defense personnel interested in all aspects of employing unmanned systems in an operational environment now and in the future. The official launch of the program, complete with a new website and monthly newsletter will occur at the ROBOTS in the ROSES Research Fair on 31 March 2011 at 1500 in the Herrmann Hall Rose Garden.

NPS is a hotbed for robotics and unmanned systems research, with students and faculty across departments working on different components of concepts, research and development. Where one group of researchers might be exploring how to best develop sensing capabilities to help unmanned systems navigate the battlefield, for example, another department across campus might be exploring the ethical implications of using unmanned systems in combat. CRUSER will facilitate connecting the two and others in their fields, utilizing each group's findings to contribute to the bigger picture.

Robots and unmanned systems are increasingly being developed and utilized within the Navy to handle tasks that are too dull, dirty or dangerous for humans to perform. NPS students studying unmanned capabilities are encouraged to

work with faculty, government laboratories, other universities, and Navy experimentation programs to fully explore the potential of these systems to support the war fighter. Developing a generation of officers ready to employ unmanned systems is an important CRUSER objective. Other goals include inspiring concept generation for new unmanned technologies, offering and aligning education programs, conducting and participating in at sea experimentations, and conducting cooperative research in all aspects of unmanned systems. CRUSER Program Director Jeff Kline, notes the value of the program in support of the DoD's mission.

"CRUSER has the opportunity to align a lot of different people and bring them together in conversation," said Dr. Timothy Chung, Director of Research and Education for CRUSER. "Conversation leads to collaboration. And that collaboration is what's going to make things happen. Especially in the area of robotics, which is interdisciplinary by definition. You can't just do it with one field anymore, and robotics is a good example of that.

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Upcoming Research Fair at NPS  
31 March: 1500-1800

**JOIN THE  
CRUSER  
COMMUNITY  
OF INTEREST**

[http://www.nps.edu/  
Research/CRUSER](http://www.nps.edu/Research/CRUSER)

### CRUSER News Contributions

Short articles of about 200-300 words are needed for future CRUSER News'.

Please contact Lisa Trawick at [cruser@nps.edu](mailto:cruser@nps.edu) for additional information.

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## DIRECTOR'S CORNER

**"CRUSER'S OVERALL GOAL IS TO CAPTURE NPS'S UNIQUE SYNERGY BETWEEN OPERATIONALLY EXPERIENCE STUDENTS AND A DIVERSE FACULTY WHO FOCUS ON DEFENSE RELATED ISSUES. THE INNOVATION, TECHNICAL TALENT, AND CONCEPT GENERATION POTENTIAL AT NPS PROVIDES AN EXCELLENT FOUNDATION FOR A DEPARTMENT OF DEFENSE VENUE TO COOPERATIVELY ENGAGE IN ALL ASPECTS OF UNMANNED SYSTEM EDUCATION AND RESEARCH"**

**CAPT (RET) JEFF KLINE, USN, CRUSER DIRECTOR**

### Military Robotics Revolution Expert visits NPS

by Barbara Honegger

Just one day before "Watson," the IBM Supercomputer, made history by defeating its human creators, one of the nation's top robotics experts held NPS students and faculty spell bound with his fast-paced review of the revolution in unmanned military systems.

Dr. Peter W. Singer, Foreign Policy Senior Fellow and Director of the 21st Century Defense Initiative at the Brookings Institution, presented the Secretary of the Navy Guest Lecture on the topic of his latest book, "Wired for War: The Robotics Revolution and Conflict in the 21st Century" (Penguin, 2009), Feb. 15. The book, which made "The New York Times" bestseller list in its first week of release and has been named Book of the Year by "The Financial Times," is official reading at the National Defense University and a wide range of U.S. Air Force and Navy and Royal Australian Navy organizations.

"Peter Singer is one of the world's leading experts in changes in 21st Century warfare and in understanding the revolution in the networked human-and-machine world that we're all immersed in," NPS Intelligence Chair Andy Singer told the assembled student

body in introducing one of Foreign Policy's Top 100 Global Thinkers. "Each one of you are part of this revolution, and what you do here at NPS and take with as you move on to your next duty assignments will have a major impact on the shape it takes in the future."

The speed of that revolution was brought home when the Intel Chair noted that "Watson" was then tied with its human competitors on "Jeopardy." The next day, it had won. He then turned the podium over to the speaker, the youngest scholar to be named a senior fellow in Brookings' 90-year history.

"In 1960, the entire U.S. Navy computing power was less than on the chip in the singing Valentine's card you bought the other day, and as late as 2002 the director of the FBI didn't have a computer in his office," Singer said. "Soon, our computing power will be billions of times what it is today, and the technologies and capabilities such power will make possible, we can only imagine.

"We're in the 'game changer' that we've been saying was coming," Singer stressed, "a new experience of war in which robots and unmanned systems operated at distances of thousands of miles are being deployed at an exponential rate and changing the face of warfare. Just a few years ago, images like these were still science fiction, but today they're science fact," he noted as a metal

menagerie of land, sea and air robots flashed on the screen behind him. "These unmanned vehicles aren't future visions. They're an integral reality on today's battlefields.

"Today, for example, IEDs [Improvised Explosive Devices] are the number one cause of death and injuries of our overseas military personnel. To reduce that toll, we recently sent in an EOD [Explosive Ordnance Disposal] trooper to check out a possible IED in Iraq. When the trooper got close enough to see if it was a real bomb, the device exploded. But the EOD trooper didn't die. The trooper was a 42-pound robot made by a robot company of Massachusetts.

Remainder of article located at: <http://www.nps.edu/About/News/Military-Robotics-Revolution-Expert-Gives-SGL-as-Supercomputer-Beats-Its-Human-Creators.html>



US Navy Photograph by Javier Chagoya

## STUDENT RESEARCH

In-progress - Final Distribution Summer 2011

**LT MATTHEW LARKIN**

### BRAVE NEW WARFARE: AUTONOMY IN LETHAL UAVS

The current laws of war are largely insufficient regarding the combination of machine autonomy in conjunction with the use of lethal force. Military ethics also do not specifically address the marriage of autonomy and lethal force. An applied understanding of the just war theory can offer a starting point to consider the ramifications of introducing lethal autonomous platforms into the force structure. Before autonomous platforms that make their own decisions to kill human beings are introduced in battle, we need to prudently consider the grave ethical ramifications of unleashing this game changing military technology. The introduction of autonomy could potentially be used when it can serve as a force multiplier and when flexibility can be maintained. Rather than further removing the war fighter, these various levels of autonomy could possibly serve to enhance the war fighter's ability to focus on more critical tasks such as executive oversight of decisions to employ lethal force. Semi-autonomous platforms may bring significant advantages to the Armed Forces and enhance our abilities for mission accomplishment, but a boundary needs to be drawn before "robots" are allowed to decide whether to kill human beings. This goal is not only ethical, but it is also pragmatic in that respect for the basic human rights of adversaries and local populations in conflict zones is necessary to achieve success in wars and attain a lasting peace.



### CRUSER (cont p1)

"In a robotics system, it's necessary to have all of these different pieces working together," he continued. "You can't just build them in isolation and throw them together and expect them to work. So there needs to be some understanding, some translation that occurs when people talk with one another, and CRUSER can help bring those people together. And even if they just have coffee together on a regular basis, that's already more than they are doing now, and that's helpful in the longer term when they try to do collaborative research."

Those interested in joining the discussion can join the CRUSER Community of Interest at [www.nps.edu/research/cruser](http://www.nps.edu/research/cruser) to receive updates on unmanned systems and robotics happenings.

"CRUSER's overall goal is to capture NPS' unique synergy between operationally experience students and a diverse faculty who focus on defense related issues," explained Kline. "The innovation, technical talent, and concept generation potential at NPS provides an excellent foundation for a Department of Defense venue to cooperatively engage in all aspects of unmanned system education and research"

Together, the unmanned systems and robotics community can look at some of the pressing questions to make the technology as efficient as possible, notes Chung.

### Robots in the Roses

Robots in the Roses on Thursday 31 Mar is an opportunity for NPS Faculty and other organizations to showcase robotic research areas they are working on. NPS Students are invited to attend to see the wide variety of topics available for unmanned systems and sign up to assist with future research.

CRUSER will support student thesis research on CRUSER related topics, which will allow for low-cost or free student participation on projects, experiments, and assistance with research areas.

Interested faculty and organizations can Email [cruser@nps.edu](mailto:cruser@nps.edu) to register.



## UPCOMING CALENDAR OF EVENTS

The CRUSER Calendar of Events is located on our Wiki:

<https://wiki.nps.edu/display/CRUSER/>

### Does your organization have an unmanned systems calendar of events?

Submit Events or Links to your Calendars to [cruser@nps.edu](mailto:cruser@nps.edu)

### CRUSER

#### COORDINATION GROUP

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CRUSER Director

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## JOIN THE CRUSER COMMUNITY OF INTEREST

<http://www.nps.edu/Research/CRUSER/>